UNITED STATES PATENT APPLICATION

FOR

TIE-DOWN SYSTEM AND METHOD

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TIE-DOWN SYSTEM AND METHOD

FIELD OF THE INVENTION:

This invention relates to the construction industry, and particularly to a device and method for securing a roof system to walls of a building in a steadfast manner.

BACKGROUND OF THE INVENTION:

In the construction of wooden frames for buildings, coupling and/or fastening devices are often used to join, or secure together, different frame members. One such junction includes securing a truss assembly to a wall framing or system. The truss assembly usually consists of a horizontal member attached to an inclined member, and this assembly is mounted to the wall system. Additionally, the inclined member may be attached directly to the wall system. In either case, the security of the truss to the wall system may be compromised as a result of the attachment of the inclined member to the truss or wall system. Couplings may be used to secure the trusses to the wall systems. These couplings must be durable enough to resist shear and tension loads, but simple in construction for easy, on-the-job installation.

A particular problem in climatic regions subject to severe winds is the shearing off of the roof assembly from the wall assembly during high wind storms or hurricanes. Government regulations and standards for manufactured homes for use in regions subject to hurricanes now require all roof trusses to be tied directly to the wall studs by enhanced means. Therefore, some

means for directly tying the truss assembly to the wall studs is needed.

In the past, relatively complicated couplings have been developed to mount the truss assembly to the wall. Examples of such known assemblies are seen in U.S. Pat. No. 5,561,949 issued October 8, 1996 to Knoth; U.S. Pat. No. 4,932,173 issued June 12, 1990 to Commins; U.S. Pat. No. 5,560,156 issued October 1, 1996 to McDonald; U.S. Pat. No. 5,732,524 issued March 31, 1998 to Kalker, Jr. et al.; and U.S. Pat. No. 6,094,880 issued August 1, 2000 to Thompson.

One problem which each of the known couplings suffer from is that they are not easily adapted to function with poured concrete walls in which modular wall preforms, each comprising a pair of high-density foam panels which are maintained in a parallel-spaced relationship by a series of bridging "webs" extending between and through and molded into the panels, are interlockingly stacked together to define a concrete form for the poured concrete wall. With reinforcing steel bars optionally suspended within the assembled wall form, preferably through use of hooks or other retainers provided on each bridging web, the concrete is thereafter poured between the panels to complete the wall.

The prior art does not address the need for a more effective method and device for creating securing roof systems to wall systems, and in particular to preform walls having a curable material therein. Therefore, there remains a long standing and continuing need for an advance in the art of tie-down systems that is simpler in both design and use, is more

economical, efficient in its construction and use, and is adapted to affix the roof system to the wall system in a steadfast manner.

SUMMARY OF THE INVENTION:

Accordingly, it is a general object of the present invention to overcome the disadvantages of the prior art.

In particular, it is an object of the present invention to provide a tie down system that is simple and inexpensive to manufacture.

It is another object of the invention to provide a tie-down system that is easy to install during construction.

It is another object of the invention to provide a tie-down system that is capable of withstanding large wind shear forces.

In keeping with the principles of the present invention, a unique tie-down system is disclosed having a first member that is adapted to receive trusses therein and attach the same to the wall of a building in a steadfast manner. In addition, a second member is herein disclosed that is adapted to attach the gable end trusses of a roof system to the wall system at predetermined spaces in a steadfast manner.

Such stated objects and advantages of the invention are only examples and should not be construed as limiting the present invention. These and other objects, features, aspects, and advantages of the invention herein will become more apparent from the following detailed description of the embodiments of the invention when taken in conjunction with the accompanying drawings and the claims that follow.

BRIEF DESCRIPTION OF THE DRAWINGS:

It is to be understood that the drawings are to be used for the purposes of illustration only and not as a definition of the limits of the invention.

In the drawings, wherein similar reference characters denote similar elements throughout the several views:

Figure 1 is a perspective view of a first member of a tie down system adapted to receive a member therein.

Figure 2 is a perspective view of a second member of a tie down system adapted to receive a member therein.

Figure 3 is a top plan view of a first member of a tie down system in an unassembled form.

Figure 4 is a top plan view of a second member of a tie down system in an unassembled form..

Figure 5 is a perspective partial cutaway view of a first member receiving a member therein and attaching the same to a wall system.

Figure 6 is a perspective partial cutaway view of a plurality of second members illustrating the attachment thereof to a member and anchoring of the structure to a wall system.

DETAILED DESCRIPTION OF THE INVENTION:

Referring to Figures 1 and 2, a first member 10 and a second member 12 comprise a roof tie down system. Although in a preferred embodiment first member 10 and second member 12 are used in combination for the tie down system, it is to be understood that first member 10 or second member 12 can be modified and used independent of the other.

First member 10 has a bottom panel 14 and bottom panel has a first extended region 16 and a second extended region 18 that extending in opposing directions from one another. Although first extended region 16 and second extended region 18 are illustrated in one preferred embodiment as not being in linear alignment, it is to be understood that first extended region 16 and second extended region 18 may be adapted to be in linear alignment while maintaining bottom panel 14 therebetween. A first panel 20 extends in a vertical direction and is attached to bottom panel 14 and is in proximity to first extended region 16. A second panel 22 extends in a

vertical direction and is attached to bottom panel 14 and is in proximity to second extended region 18. A guide 24 is defined by bottom panel 14, first panel 20, and second panel 22. A first aperture 26 is defined through first extended region 16 and a second aperture 28 is defined through second extended region 28.

Now also referring to Figure 3, one preferred method of constructing first member 10 is set forth. It is to be understood that although a unitary method of construction of first member 10 is herein illustrated in one preferred embodiment, first member 10 may be constructed from several disjoined elements in alternate preferred embodiments. In addition, although several preferred dimensions or shapes may be assigned to first member 10 in a preferred embodiment, it is to be understood that alternate sizes and shapes are also contemplated hereby. First member 10 may be cut out from a unitary piece of material such that first panel 20 and second panel are in a similar plane as bottom panel 14, first extended region 16, and second extended region 18. A first slit 30 is cut between first panel 20 and first extended region 16 such that first panel 20 may be manipulated into a vertical alignment in relation to first extended region 16 and bottom panel 14. A second slit 32 is cut between second panel 22 and first extended region 18 such that second panel 22 may be manipulated into a vertical alignment in relation to second extended region 28 and bottom panel 14. By varying the length of slits 30 and 32, the width of bottom panel 14 and, in turn, guide 24 may be varied accordingly.

Now referring to Figure 2 in particular, second member 12 has a bottom plate 34 with an extended section 36 extending therefrom in a substantially similar plane. Bottom plate 34 has a first edge 38 and a second edge 40, and a top edge 42 at a point distal to extended section 36. A

first plate 43 extends from top edge 42 of bottom plate 34 in a substantially vertical manner. However, in an alternate embodiment, first plate 43 is omitted and does not affect the functioning of second member 12.

Extended section 36 has a first border 44 and a second border 46 which are interconnected by a third border 48, such that third border 48 is distal to bottom plate 34. A first sheet 50 arises from first border 44 of extended section 36 in a vertical direction and extends for a substantial length thereof. A second sheet 52 arises from second border 46 of extended section 36 in a vertical direction and extends for a substantial length thereof. First sheet 50 has a first front border 54 and second sheet 52 has a second front border 56. A third sheet 58 extends from first front border 54 in a substantially perpendicular manner and a fourth sheet 60 extends from second front border 56 in a substantially perpendicular manner in relation to first sheet 50 and second sheet 52 respectively. A first channel 62 is defined by first plate 43, bottom plate 34, third sheet 58, and fourth sheet 60. In addition, at least a hole 64 is defined through extended section 36 with predetermined dimensions.

Now also referring to Figure 4, one preferred method of constructing second member 12 is set forth. It is to be understood that although a unitary method of construction of second member 12 is herein illustrated in one preferred embodiment, second member 12 may be constructed from several disjoined elements in alternate preferred embodiments. In addition, although several preferred dimensions or shapes may be assigned to second member 12 in a preferred embodiment, it is to be understood that alternate sizes and shapes are also contemplated hereby. Second member 12 may be cut out from a unitary piece of material such

that first plate 43, first sheet 50, second sheet 52, third sheet 58, and fourth sheet 60 are in a similar plane as bottom plate 34 and extended section 36. A third slit 66 is cut between third sheet 58 and bottom plate 34 such that first sheet 50 may be manipulated along first border 44 to be in vertical alignment in relation to extended section 36 and bottom plate 34. A fourth slit 68 is cut between fourth sheet 60 and bottom plate 34 such that second sheet 52 may be manipulated along second border 46 to be in vertical alignment in relation to extended section 36 and bottom plate 34. In an alternate preferred embodiment, a fifth slit 70 and a sixth slit 72 are cut into first plate 43 in a perpendicular direction to top edge 42 such that a first flap 74, a second flap 76, and a third flap 78 are created. At least one of flaps 74, 76, or 78 may remain in a horizontal plane while at least one of flaps 74, 76, or 78 are manipulated along the top edge 42 axis to be in vertical relation to bottom plate 34. The length of the slits 70 and 72 determines the length of flaps 74, 76, and 78, and the horizontally aligned flap may be utilized to set second member 12 a specified distance from a structure and also for alignment of second member 12.

Now referring to Figure 5, first member 10 is illustrated enclosing a member 80 and attaching member 80 to a structure 82. Although a preform wall is illustrated as structure 82, it is to be understood that first member 10 may also be used with other wall structures such as, but not limited to, wooden frame wall system.

Structure 82 is formed by pouring a suitable curable material 84, such as concrete, between a first wall 86 and a second wall 88. Structure 82 for purposes of illustration, but not limitation, may be obtained from AAB Building Supplies, Inc. of Ottawa, Canada, under the trademark BLUEMAXX® which uses a plurality of interlocking modular performs to construct a

structure 82 of desired length. After curable material 84 is poured between first wall 86 and second wall 88, a top surface 90 is created thereby. In one preferred embodiment, a plank 92 is attached to top surface 90. Plank 92 has a plurality of voids defined therethrough and corresponding with apertures 26 and 28 of first member 10. Before curable material 84 has cured, an anchoring means 94 is inserted through each of apertures 26 and 28 and through the corresponding void in plank 92 and into the curable material 84, whereby upon curing thereof, anchoring means 94 is steadfastly held within curable material 84. Anchoring means 94 has an elongated portion 96 and a head portion 98, wherein elongated portion 96 is of sufficient diameter to pass through apertures 26 and 28 and head portion 98 is of sufficient diameter to engage extended regions 16 and 18 and to fixedly anchor first member 10 to structure 82.

In one preferred embodiment, member 80 may be a truss which has a horizontal element 100 and an inclined element 102 attached by a truss clip 104 to form the frame for a building roof. After curable material 84 has cured, member 80 is lowered into guide 24 of first member 10 such that horizontal element 100 is flush with bottom panel 14. First panel 20 and second panel 22 are then attached to member 80 by at least an affixing means 106 such as, but not limited to, threaded elements or nails. A plurality of first members 10 may be placed along plank 92 at desired locations in order to attach a plurality of members 80 thereto as is customary in the art of roof building.

Now referring to Figure 6, second member 12 is illustrated enclosing member 80 and attaching member 80 to structure 82. Although a preform wall is illustrated as structure 82, it is to be understood that second member 12 may also be used with other wall structures such as, but

not limited to, wooden frame wall system. After curable material 84 is poured between first wall 86 and second wall 88, top surface 90 is similarly created thereby. In one preferred embodiment, plank 92 is attached to top surface 90, however it is to be understood that members 10 and 12 may be attached directly to curable material 84. Plank 92 has a plurality of voids defined therethrough and corresponding with holes 64 of second member 12. Before curable material 84 has cured, anchoring means 94 is inserted through each hole 64 and through the corresponding void in plank 90 and into the curable material 84, whereby upon curing thereof, anchoring means 94 is steadfastly held within curable material 84. Anchoring means 94 may have a textured elongated portion 96 to more fixedly attach the same to curable material 84. Elongated portion 96 is of sufficient diameter to pass through hole 64 and head portion 98 is of sufficient diameter to engage extended section 36 and to fixedly anchor second member 12 to structure 82. In one preferred embodiment, elongated portion 96 has at least a half-inch diameter and is of sufficient length such that at least seven inches of elongated portion 96 is maintained within curable material 84.

In one preferred embodiment, member 80 may be a gable end truss which has a horizontal element 100 and an inclined element 102 (not shown) attached by a truss clip 104 (not shown) and vertical members (not shown) which attach the horizontal element 100 to inclined element 102 at a plurality of locations. Gable end trusses are located on opposing walls and run along the top surface thereof such that the internal trusses are located therebetween. After curable material 84 has cured, member 80 is lowered into first channel 62 of second member 12 such that horizontal element 100 is flush with bottom plate 34. Third sheet 58 and fourth sheet 60 are then attached to horizontal element 100 by at least an affixing means 106 such as, but not

limited to, threaded elements or nails. A plurality of second members 12 may be placed along plank 92 at desired locations in order to engage horizontal member of the gable end truss at a plurality of locations as is customary in the art of roof building or required by the building code of the region.

Various materials may be used to construct first member 10 and second member 12, and for purposes of illustration, but not limitation, in one preferred embodiment members 10 and 12 are constructed of a metal or a metal alloy such as, but not limited to, steel or aluminum.

While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as an exemplification of preferred embodiments thereof. Many other variations are possible without departing from the essential spirit of this invention. Accordingly, the scope of the invention should be determined not by the embodiments illustrated, but by the appended claims and their legal equivalents.